Overview and purpose of this document:

The book Statewide Wetland Strategies: A Guide to Protecting and Managing the Resource, is the product of the National Wetlands Policy Forum. The Forum met over the course of a year in 1988, and was comprised of members representing industry, government, farmers, and environmentalists. The Forum discussed many issues pertaining to the modern day conservation and management of wetlands, and reached consensus on over 100 policy improvements. The Wetland Strategies Guide is both a reference and a how-to manual for creating a state wetland conservation plan.

This document is a summary of the wetlands guidebook that the Forum produced. This summary contains much of the information contained in the Wetland Strategies Guide, but is not meant to be a stand-alone document. It is best used for familiarization with pertinent wetlands topics, whereupon the wetlands guidebook can be referenced to obtain more complete information.

Copies of the original Forum publication will be made available through MDE staff. Additional copies are available from Island Press by calling 1-800-828-1302.

Source document:

World Wildlife Fund. 1992. Statewide Wetlands Strategies: A Guide to Protecting and Managing the Resource. Island Press, Washington, DC

Contents:

Introduction

What is a Comprehensive Strategy?

A Comprehensive Statewide Wetlands Strategy is an organizational tool to identify opportunities and to make programs work better, for wetlands conservation. An effective strategy:

- draws clear objectives that eliminate confusion
- brings all interested parties into the decision making process
- streamlines existing state and local programs to address gaps and shortcomings
- dovetails with federal programs where possible
- makes better use of staff and financial resources
- creates a coherent plan to protect wetlands, tailored to the State's particular needs

The National Wetlands Policy Forum

The National Wetlands Policy Forum (1988) was a consortium of industry and government leaders, farmers and environmentalists. The forum agreed on 100 policy improvements to protect wetlands, while reducing unnecessary frustrations with regulatory programs. The Forum found that an overall goal was a vital key for consistency.

Why States Should Take the Lead

The reasoning for a statewide focus for wetlands conservation stems from:

- The ability for a state to develop a comprehensive plan, that can address all major threats to wetlands.
- The flexibility with which a state can use a combination of programs and resources to accomplish wetlands goals
- The regional focus which allows for site specific conflict resolution and planning

Elements of a Statewide Strategy

Important parts of a comprehensive statewide strategy include:

- An overall goal
- Information about the State's wetlands, (location, type) and their potential threats
- An assessment of current wetlands protection efforts
- An action plan
- A funding strategy
- A monitoring and evaluation plan
- The ability to evolve over time

The Role of Federal Government

A wetlands strategy should ensure that the state gets the most out of federal programs. It should also find areas where federal programs show conflict, and could be modified.

The Role of Local Governments

The role of local governments in wetlands protection is quite substantial, since they have much of the control over land use. The strategy should address local needs and concerns, and require incorporation of the plan into zoning and other pertinent ordinances.

The Role of the Private Sector
The private sector needs to be involved with the planning process to account for businesses' needs being met, and to incorporate the valuable resources that businesses have to offer.

Why Undertake a Statewide Wetlands Strategy?

A Strategy can encompass many concerns and benefits, including flood control, water quality, fisheries, waterfowl, biological diversity, groundwater, erosion, and recreation.

Problems in Wetlands Protection and How a Strategy can Help

- Conflicts between development and wetlands protection, often caused by uncertainty
- Failure to consider both land use and hydrology in wetlands protection
- Over-reliance on regulatory programs
  - more incentives are needed for private landowners, (holders of ¾ of wetlands), protect areas voluntarily
- Inadequate maps and other data
  - plan can identify and compile existing data, identify gaps and needs, decide on methodologies for best gathering, storing, updating and analyzing data.
- Inadequate tracking of permits and changes in wetlands
  - a tracking system can be developed, common reporting forms can be developed
- Lack of protection policies for public lands
- Lack of policies for public infrastructure and development
  - how do wetlands regulations apply to State or Federal projects?
  - can large projects facilitate mitigation banking?
- Limited scope of regulatory programs
  - strategy can draw on not only wetlands, but pollution control, floodplain management, solid waste disposal, and other programs, to fill gaps in current protection efforts, (and so the plan is not working alone).
- Duplication and inconsistencies in permitting
- Limited budgets, staff and expertise
  - Plan can provide for cooperation to facilitate most efficient uses of resources
- Failure to identify sites with restoration potential
  - Mapping areas based on restoration potential
- Lack of acquisition priorities
  - define a broad range of priorities for acquisition and restoration

Part I: Creating a Wetlands Strategy

I.1 The Overall Goal

In order to be effective, a goal needs to serve five main purposes:

1) Promote consistency among programs and levels of government
2) Provide a benchmark for assessing progress; components can't be fine tuned without measurable performance.
3) Help in obtaining support; establishing and publicizing goals can be an effective way to gain support. People (and businesses, organizations) are unlikely to support a plan with uncertain goals.

4) Provide an underlying purpose for all activities to be carried out
5) Help transcend changes in leadership. The plan should be able to endure political changes.

Defining the Goal

- What are wetlands? A definition needs to be agreed upon
- What is wetlands loss? Do we include only wetlands lost to footprint or fill, or also losses to function, spatial distribution, or affects on the surrounding landscape? How are losses from natural processes classified?
- Are wetlands gains and losses measured quantitatively or qualitatively?

Progressive Implementation of the Goal

A SWCP may implement any of its goals in stages. Examples of this include requirements first applying to new public developments, then new private ones, then restoration of older impacts, etc. This process will allow the agencies responsible for implementation time to adjust to new procedures, and will give those that are affected by the changes in rules time to adjust their methodologies before they encounter conflicts.

General Guidelines for Strategy Development

1) Reconcile environmental and economic needs and identify opportunities to reduce conflicts between development and protection interests.
    - Advance planning, especially for areas with sensitive resources under strong development pressure, can help channel development to or away from certain areas, by affecting permitting.
    - Flexible zoning by adjusting densities (cluster zoning) can provide for both environmental and economic needs.
    - Are certain developments wetlands-friendly? If so, how does that effect zoning/ regulations?
2) A Wetlands Conservation Strategy should be built on the strength of existing programs.
    - Consider state-federal coordination
    - Develop coordination among state agencies
    - Foster state-local cooperation
    - Facilitate government-private sector relationships
3) A strategy should include both regulatory and non-regulatory mechanisms.
4) Strategy should include both statewide and site-specific policies and programs
5) Consider water resources in addition to land use
    - Use water quality reviews
    - Use water quantity reviews
6) Promote landscape approaches for protection and management decisions

I.2 Developing a Strategy

Step 1: The Current Scenario

- How many wetlands does the state have, and where are they located?
- What kinds of wetlands are they?
- What are the functions of existing wetlands?
- What conditions are all of the wetlands currently in?
- How rapidly are wetlands disappearing, where are losses/impacts most concentrated?
- What activities are most responsible for wetlands degradation and loss?

- What are the consequences of wetlands degradation or loss?

Step 2: Establishing Strategy, Goals and Objectives

These should apply both to public and to private entities. Goals may be different for separate parts of the plan, and they may be different for various participants. Goals may even be established for existing programs.

Legislative Goals

Strengths – binding and enforceable, can survive changes in administration and personnel, can apply to both public and private.

Challenges – requires strong political support, can be time and resource intensive, the political process may weaken the original directives of the rules.

Considerations – political support, sufficient resources, will this delay adoption of the plan, will this hinder development, does the goal need legislation at all?

Regulatory Goals

Strengths – can have the force of law within the scope of the administering agency, provides opportunities for public comment, can be enacted more quickly than legislation.

Challenges – limited by scope and intent of law, can easily be revised, can produce a negative legislative backlash.

Considerations – is there authority to adopt the goal? Can the regulation cover a wide range of activities?

Executive Order Goals

Strengths – can have a multi-agency scope, expedient, helps agencies set priorities.

Challenges – only applies to executive agencies, may be changed by the following administration, can't expand agency jurisdiction.

Considerations – does the governor support the goal? How much can be accomplished by the goal, if it only applies to state agency activity?

Policy Goals

Strengths – less time consuming than binding actions, can raise public awareness.

Challenges – advisory only, not mandatory

Considerations – what is the appropriate agency to implement the policy, can the policy adequately promote the goal?

Step 3: Identifying and Assessing Existing Programs

1) Locate and establish contact with groups that have wetland-based programs.
2) Research and discover successful programs to use as models.
3) Identify areas where cooperation is possible.
4) Identify weaknesses, inconsistencies and gaps in current programs.
5) Locate sources of technical information, and other useful resources.

Step 4: The Best Use of Current Protection Mechanisms

Federal Mechanisms

Programs such as the North American Waterfowl Management plan.

Grants like NWI, US EPA's Wetland State Development grants.
Acts including Pittman-Robertson and Dingell-Johnson acts, the North American Wetlands Construction Act, and the Land and Water Construction Fund.

State Mechanisms

- Incorporate wetlands protection into floodplain and shoreline management.
- Develop water quality standards for wetlands, so that section 401 certification can be used effectively.
- Undertake statewide land-use planning.
- Complete special area planning.
- Incorporate wetlands protection into public works projects.
- Extend coastal and estuarine wetlands planning to the rivers and streams leading to them.
- Provide technical assistance and funding to local governments.
- Improve state wetlands regulations.

Local Mechanisms

- Encourage local governments to look at wetlands protection as a part of public works and planning.
- Encourage or require local governments to include wetlands protection in local zoning ordinances.
- Promote the use of flexible zoning techniques.
- Encourage initiation of local greenway efforts.
- Encourage local management plans.

Private Programs

Non profit:

- Research and advocacy groups can provide education and scientific expertise, as well as political impetus to protection efforts
- Hunting, fishing, or other groups may acquire or maintain wetlands.
- "Friends of" groups or watershed associations can build interest and support for a specific area, host celebrations and events.
- Foundations can raise funds for protection or acquisition.
- Land trusts can help to acquire land.

For profit:

- Landowners can create wetlands on their own land.
- Owners can donate, sell or give easements to public or nonprofit organizations.
- Companies can publicize threats to wetlands.
- Individuals can foster public support.
- Individuals and companies can participate in land use decisions.
- Private interests can lobby or negotiate with political positions.

Step 5: Seeking Funding from a Variety of Sources

This section serves as a starting point for locating grants, donations, and other forms of funding from federal, state, and local/private sources.

Table 1.1 Federal Sources

	Acquisition	Regulatory Programs	Planning	Restoration, Creation, Mgmt.	Technical Assistance, Education	Research
Coastal Wetlands Planning, Restoration Act	⊗			⊗		
Coastal Zone Management Act	⊗	⊗	⊗	⊗	⊗	⊗
Land and Water Conservation Fund	⊗					
North American Wetlands Conservation Act	⊗			⊗		
Federal Aid in Sport Fish Restoration Act	⊗					
US EPA State Wetland Program Development Grants		⊗	⊗		⊗	⊗
US NPS Grants for state Comprehensive Outdoor Recreation Planning			⊗			
Dingell-Johnson, Pittman-Robertson Acts				⊗		
EPA Assistance for High Priority Estuaries			⊗			
National Coastal Wetlands Construction Grants				⊗		

Table 1.2 State Sources

Funding Type	Advantages	Disadvantages
Fees (variable or flat)	Relatively common and well accepted, used for establishing a link between demand and cost of providing	Can be sporadic in provision of income
Taxes Excise- (goods/services) Stamp – (licenses)	Can be placed on those who benefit most from or most affect wetlands, revenues can be earmarked for certain projects	State legislatures don't like giving revenues to individual programs, places administrative burden on collection agency
Fines and Penalties	Effective, can be used for acquisition or restoration, or placed into special funds	Not always related to wetlands programs, fluctuates as revenue, enforcement hard and fines rare
Bonds	Good for programs with large initial capitol costs, and future benefits	Not independent – have to be repaid, often not useable for operating costs
Lottery	Voluntary use gains acceptability for voters	Regressive – lower income groups pay more than most, must compete with other lottery funded programs
Voluntary Contribution	Citizens give willingly, tax deductible	Many will not give, must compete with other concerns in check-off boxes
Trust Funds	Used only for special purposes, less threat of political interference	Creates administrative burdens, legislators may oppose, legislators can gain access to money

Local Sources

Local sources of funding include sales tax, tourism and impact taxes, real estate transfer fees, and other sources.

Step 6: Looking for Other Opportunities to Strengthen Protection Efforts

Both positive and negative factors can be used to strengthen protection efforts. Positive events such as celebrations, or announcements of large wetland donations or restorations can generate recognition. Additionally, negative influences can create potential for wetlands growth. Pollution problems such as post-treated sewage, stormwater, or agricultural runoff, can all be treated with new purpose-created wetlands. Furthermore, using disaster events such as floods

or large pollution incidents can gain media attention, which can draw support for future protection or restoration efforts.

Step 7: Developing Monitoring and Evaluation Plans

Monitoring – the day to day tracking of program progress and outcomes.

This is the continuos tracking of measurable results. Examples include: the number of permits issued, attendance at workshops, or program costs. The tracking system must be easily updated and accessed. Monitoring information may be used to modify projects, locate problem areas or repeat offenders, and assess some measures of success.

Evaluation – infrequent but comprehensive review of program implementation.

The two types of evaluation are process and impact.

Process evaluation is qualitative and addresses goals, policies, relationships and procedures. This method is useful for understanding the context in which the program operates. Data is often gathered from interviews.

Impact evaluation is quantitative. Impact evaluation measures program outcomes to specific target levels over time. Data is gathered from monitoring records, and comparing them to a set standard.

Most important is to make good use of evaluation findings.

Measuring Progress –

Identify sources that maintain "Status and Trends" records or reports. Additionally, look for ways to measure progress, through evaluating current record keeping systems.

Track positive progress that is instigated by the Plan, by incorporating a recording or reporting scheme into new projects.

Resource Assessment Studies may also need to be carried out periodically, to gain an overall picture of ecosystem health. These studies may should take advantage of mapping capabilities.

Part II: Organizing a Strategy Development Process

Strategy Development Process

Developing a conservation plan is likely to involve the use of several development processes, depending on the subject matter, and the purpose of each particular plan development. This section will review the different types of development processes, with the pro's and con's of each.

1) Informal Outreach – the process coordinator (here, MDE) provides information to groups and individuals, and determines the priorities and concerns of each. Examples are surveys, brochures, newsletters and hotlines.

Strengths –

- generally inexpensive, generates interest and understanding of a strategy, determines the concerns of a variety of people
- allows for efficient assessment of stakeholders' knowledge and perceptions
- No need to coordinate large groups
- Often can be undertaken in a short time

Limitations –

- Does not let interested stakeholders hear what is important to other stakeholders
- Limits chances to generate options that satisfy diverse stakeholders
- Seldom eliminates conflict

2) Public Meetings – any interested stakeholder can attend, can either be one-way; recording comments, or two way; responding to questions

Strengths –

- Allows any stakeholder to share views, and to possibly ask questions
- Allows stakeholders to hear each other react to different issues
- Requires only modest resources

Limitations –

- Offer limited opportunity to discuss agreements or disagreements
- Do not promote collaboration
- Do not promote a forum to address surfacing conflict
- Vocal constituents may dominate meetings

3) Workshops – a forum where various stakeholders discuss given issues

Strengths –

- Lets stakeholders concentrate on areas of specific interest
- Fosters increased public understanding
- Encourages interactive discussions and new ideas
- Enables some disputes to be resolved

Limitations –

- Process coordinator needs time to identify participants, plan agenda, moderate
- Participation may be limited, various interests may be excluded
- Some disputes that are not resolved may emerge in other forms

4) Advisory Committees – members assigned for one or more plan components

Strengths –

- Allow diverse stakeholders to help guide strategy development and explore difficult issues
- Encourages interactive discussions
- Provides opportunities for developing recommendations on issues

Limitations –

- Can be time consuming and resource intensive
- Process coordinator needs to coordinate committees in addition to other duties
- May be difficult to keep a diversity of interests in committees, while keeping small size
- Committee members may not adequately represent their constituents, may not report back as they should
- May not provide resolution for all issues

5) Formal Negotiations – all stakeholders represented for a very official decision making process

Strengths –

- Formal negotiations allow diverse stakeholders to explore ways of achieving joint goals
- Can be effective in breaking political stalemates
- Stakeholders will have an investment in the outcome

Limitations –

- Can be time consuming and resource intensive
- Strong preliminary effort must be made to ensure that; sufficient incentives exist to reach agreement, process is structured to meet objectives, appropriate people are involved
- Members may not adequately represent their constituency
- Use of a mediator increases cost

6) Joint Fact Finding – collecting and analyzing data

Strengths –

- Overcomes barriers to agreement related to data
- Data collection resources are focused on areas that everyone agrees are most critical
- Significant resources aren't wasted on studies that are irrelevant or inadequate

Limitations –

- Fact finding can be time consuming and difficult
- Resources may not be available for all data collection efforts

Asking the Key Questions

In order to choose the right process from the above list, certain questions need to be addressed

- What decisions have to be made?
  - How much data is to be collected
  - How the regulatory program should be applied
  - What role mitigation should play
  - How to use educational tools
  - How to allocate funding
  - Who directs implementations

- What is the desired outcome of the plan?
  - Consensus level
  - Product can be a strategy, policy tool, information source, or communication aid

- Who are the stakeholders?
  - Agencies, groups, individuals who can make decisions dealing with or be affected by regulations on wetlands
  - Leaving out stakeholders will leave the plan vulnerable to sabotage
  - Representatives need to be backed by the organizations they represent, have power to make decisions on their organization's behalf
  - Representatives used for groups (coalitions) with similar interests, to keep numbers of participants manageable

- What are the relevant issues?
  - The more controversial the issues, the more formal the process should be to address them
  - If an issue can't be agreed upon, or is too controversial, a process can be developed for excluding the issue until it can be deal with in a different forum

- How important are the issues to stakeholders?
  - Can everybody gain by changing the status quo, or is it only going to get worse for

some groups, whose mission will be to limit the extent and effectiveness of the plan?

- What are the potential risks of dialogue?
  Are parties working on similar interests outside of the plan?

- Who is responsible for implementation?
  Implementing authorities need to be present
  If laws will be recommended, legislative representatives should be there

- What resources are/ will be available?
  Both funding, staffing, and other resources should be considered both for the plan's development and implementation
- When would a mediator be useful?
  Consider group sizes, process formats, and how controversial each issue is

Managing a Collaborative Process

Step 1) Lay the groundwork
  Gain the governor's support, gather information about stakeholders, develop a work plan, conduct outreach activities, begin to work with media
Step 2) Select Participants
  Choose all of those who can affect or be affected by the outcome
Step 3) Develop Objectives
  Process coordinator should propose broad objectives, work with stakeholders to add, subtract, or make modifications to them, link all future activities to them
Step 4) Establish Protocols
  A set of well-defined ground rules in which to operate
Step 5) Delineate the issues
  Each stakeholder addresses priorities and concerns, discusses how to address issues, education about them
Step 6) Build effective support
  Create an atmosphere to foster creativity, identify high priority actions
Step 7) Develop an Agreement
  Must be able to be implemented, should contain agreement points, certain decisions can be put aside or officially excluded until a later date
Step 8) Implement Outcomes and Maintain Support

Part III: Mechanisms for Protecting and Managing Wetlands

III.1 Introduction

Mechanisms should be considered in relation to one another, and in the context of relevant social, political and economic factors. Eight main mechanism types are discussed in this section.

1) Acquisition – protection of wetlands either by outright ownership, or by ownership through donation or purchase of the development or other rights on a given property.
  Strengths –
  - Can ensure permanent protection and management of the site

- Can be tailored to specific needs of the acquiring organization –owning outright, or owning certain property rights
- Can offer opportunities to coordinate with other organizations and mechanisms, such as tax incentives, planning, research
- Can avoid "takings" claims and political controversies

Challenges –

- May require extensive resources for purchase and management
- May require careful management and enforcement
- May be difficult to acquire certain lands
- Does not guarantee protection – management is required
- Cannot control activities on adjacent lands
- May meet resistance due to taking lands off tax base

Key Opportunities –

Federal – Land and Water Conservation fund
North American Wetlands Conservation Act
Pittman-Robertson and Dingell-Johnson Acts

State - Natural area acquisition programs
Parks and Recreation Programs

Local - Parks and open space programs

Private - Land trusts

2) Regulation – focusing on the resources, or the activities affecting them

Strengths –

- Can prohibit activities
- Can be enforced
- Can be adapted to various levels of government
- Can promote the most suitable uses

Challenges –

- May be resource intensive, requiring funding or expertise
- May exclude valuable wetlands, or certain activities, depending on scope
- May be unpopular
- Are primarily reactive as opposed to proactive
- May cause "takings" challenges

Key Opportunities –

Federal – Section 404
Section 401 Water Quality Certification
Consistency under Coastal Zone Management Act

State - Wetlands regulatory programs
Floodplain management programs
Shoreline management programs
Coastal zone management programs

Local - Zoning
Floodplain regulations
Stormwater regulations

3) Planning – analyzing needs and setting goals

Strengths –

- Can be adapted to fit a wide range of situations, from local to regional
- Can account for natural losses and changes

- Can account for cumulative impacts by showing the big picture
- Can help avert development vs. preservation conflicts
- Can offer predictability and consistency in government regulation and land use

Challenges –

- May be difficult to translate the plan into action, and to amend it
- May be time consuming and resource intensive
- May be difficult to secure interest and cooperation from all parties in a fair and efficient way
- May offer predictability, but without precision
- May be difficult to outlast political changes

Key Opportunities –

Federal – State comprehensive outdoor recreation plans
Advanced identification
Special area management plans

State - Statewide land use plans
Wetlands plans
Zoning or infrastructure plans

4) Restoration, creation, and management

Strengths –

Can be used to offset natural losses
Can offer opportunities to regain lost functions
Can target a particular area in need
Can be coordinated with other programs
Can be relatively easy and inexpensive
Can encourage landowner involvement

Challenges –

May require extensive technical expertise
May require substantial funding/staff time
May be difficult to coordinate efforts between multiple owners and agencies
May disturb natural flora and fauna
Have had questionable success in the past, especially in creation

Key Opportunities –

Federal – North American Waterfowl Management Plan
National Coastal Wetlands conservation grants
Coastal Zone Management Act

State – Wildlife enhancement programs
Water quality programs

Local - Wastewater treatment projects
Parks and recreation programs

Private - Waterfowl enhancement programs

5) Incentives and Disincentives – recognition, special access to funds, exclusion from funds

Strengths –

Can encourage voluntary participation – makes protection more profitable than conversion
Elicits strong public support
Less intensive or coercive than regulations

Challenges –
Do not guarantee protection
May be costly
Sometimes misperceived as regulations – i.e. swampbuster
Key Opportunities –
Federal – Farm Bill programs
Coastal Barrier Resources Act
National Flood Insurance Program
State - Tax incentives
Registration programs
Local - Property tax incentives
Transfer of development rights
Private – Awards programs

6) Technical Assistance, Education, Outreach
Strengths –
Can target a narrow or broad audience
Can be tailored to match available resources
Can elicit strong public and political support
Creates opportunities for cooperation between public and private sectors
Can increase the effectiveness of other programs
Can encourage volunteer participation
Challenges –
May be time consuming and resource intensive
Hard to measure benefits
Easily eliminated with budget cuts
Key Opportunities –
Federal – National Wetlands Inventory
EPA technical assistance programs
State - Local government assistance programs
Environmental education curricula
Local - Landowner assistance programs
Private - Education Programs

7) Research
Strengths –
Can provide data justifications and support for other programs
Can increase the effectiveness of other programs
Can help set priorities for protection
Can evaluate current programs
Can heighten public awareness
Challenges –
May be time consuming and resource intensive
Results may take years to generate
Results may be difficult to disseminate
Funding may be difficult to find
Key Opportunities –

Federal – Coastal Zone Management Act
EPA Wetland Program state development grants
State - State universities
Local - Community colleges
Private - Nonprofit and corporate research programs

8) Cross-cutting tools – most effective approaches, should be included in all strategies

Coordination – insuring programs work together

Strengths –

Can help define conservation priorities and maximize efforts for everyone's benefit

Can promote better use of available resources such as staff and expertise

Can minimize duplicated efforts and consistencies

Challenges –

May be difficult and time consuming

May be hard to overcome "turf" struggles

May be difficult to overcome contradictions among perspectives of programs

Landscape approaches

Strengths –

Can control impacts that occur beyond wetlands boundaries

Can account for cumulative impacts

Challenges –

May be difficult to manage due to overlap of political boundaries

May be difficult to measure functions at landscape level

III.2 Federal Mechanisms

This section provides a basic overview of most of the federal programs that could be used by, or could affect a state's wetland conservation plan.

1. Clean Water Act: Section 404

States can assume responsibility for the Section 404 program, which regulates the discharge of dredged or fill material in wetlands and other waters of the United States. States may also influence the issuance of Section 404 permits through Section 401 water quality certification or coastal zone consistency. States, local government, private groups, and individuals can comment on proposed permits and can help bring violations to the attention of the Corps of Engineers and the EPA. Maryland has already assumed responsibility of the Section 404 program, through the Maryland State Programmatic General Permit.

The Corps has the primary responsibility for the permit program, and is authorized after notice and public hearing opportunity, to issue permits for the discharge of dredged or fill material into waters of the United States, including wetlands. The proposed activity must be in compliance with environmental guidelines (Section 404b).

2. Clean Water Act: Section 404 Advanced Identification

States, local governments, and private groups can play a major role in Section 404 Advanced Identification by requesting that the process be conducted, by providing information, and by commenting on wetlands identified as generally suitable or unsuitable for discharge permits. Advanced Identification provides some predictability to wetlands regulation. It can

also be helpful in resolving conservation and development conflicts in areas of rapid growth, and in controlling cumulative impacts on wetlands.

Section 230.80 of the Section 404(b)(1) guidelines of the Clean Water Act provides for a planning process whereby the U.S. EPA and the Corps identify wetlands that are generally suitable or unsuitable for discharge permits in advance of any specific permit applications. Unless tied to another regulatory authority, these designations are only a guideline, and not binding.

3. Clean Water Act: Section 404 General Permits

General Permits allow certain activities to occur without individual federal permit approval, thus streamlining the process. By denying water quality certification or coastal zone consistency, states can in essence veto or condition general permits. Some general permits require that state permits be obtained.

Under Section 404(e) of the Clean Water Act, the Corps is authorized to issue general permits, on a state, regional, or nationwide basis, for categories of activities that are similar in nature and that will cause only minimal individual and cumulative environmental effects. Activities include minor road crossings, and bank stabilization.

4. Clean Water Act: Section 404 State Assumption

States can assume administration of the federal program, and Maryland has already done so. However, jurisdiction is retained by the Corps in navigable waters, waters adjacent to navigable waters, or waters subject to tidal ebb and flow. EPA can withdraw approval if a state fails to meet standards.

5. Clean Water Act: Water Pollution Control

Federal programs for water pollution control are based on state water quality standards. States can protect wetlands through these programs by developing water quality standards specifically for their wetlands. States can also designate wetlands as Outstanding National Resource Waters in which no degradation of water quality is allowed. Also, states may protect or restore wetlands as part of landscape-based approaches to controlling non-point source pollution.

6. Clean Water Act: Water Quality Certification

Under Section 401, states have the authority to review any federal permit or license that may result in a discharge to wetlands and other waters under state jurisdiction, in order to ensure that the actions would be consistent with the state's water quality requirements. If a state denies certification, the federal permit or license cannot be issued. States can also qualify certifications by specifying conditions that must be met.

7. Coastal Barrier Resources System

The Coastal Barrier Resources Act is an attempt to reduce development within units of the CBRS thereby reducing loss of life, property, and important natural resources as a result of coastal storms.

The Coastal Barrier Resources Act denies federal subsidies for development within undeveloped coastal barriers designated as units of the Coastal Barrier Resources System (CBRS). Congress designates areas for inclusion in the CBRS. States can complement the benefits of this act by denying state subsidies for development. They can also publicize the location of CBRS units in their state to help insure that federal flood insurance is denied in these areas.

8. Coastal Wetlands Planning, Protection and Restoration Act

Under this act, coastal states can apply for matching grants for wetlands acquisition, management, restoration, or enhancement. Priority is given to projects that are consistent with the National Wetlands Priority Conservation Plan, or are in maritime forests on coastal barrier islands. Acquired lands must be managed for long-term conservation.

9. Coastal Zone Management Act

Under this act, coastal states may voluntarily participate in the federal coastal zone management (CZM) program by preparing comprehensive CZM plans, which provide for the conservation and environmentally sound development of coastal resources. Federal grants, policy guidance, and technical assistance are available.

10. Emergency Wetland Resources Act

The purpose of this act is to "promote the conservation of migratory waterfowl and to offset or prevent the serious loss of wetlands by the acquisition of wetlands and other essential habitat, and for other purposes." The Act can provide states, local governments, and private groups with valuable information on the location and conservation priorities of wetlands.

11. Endangered Species Act

This act requires federal agencies to conserve endangered and threatened species, and prohibits any person from "taking" endangered animals or threatened species. This act can be used to protect wetlands that provide habitat for endangered or threatened species, by supporting listing of wetland-dependent species, and urging strong implementation and recovery plans. "Taking" is broadly interpreted, and applies to significantly altering habitat.

12. EPA Wetlands Program State Development Grants

States can use EPA grants for development and/or enhancement of their wetlands protection programs. Priority is given to innovative approaches and project results that can be transferred.

13. Executive order 11990

This order requires each federal agency to take action to minimize the destruction, loss or degradation of wetlands, and to preserve and enhance the natural beneficial values of wetlands in carrying out responsibilities the agency may have for (1) acquiring, managing, and disposing of federal lands and facilities; (2) providing federally undertaken, financed, or assisted construction and improvements; and (3) conducting federal activities and programs affecting land use including water and related resources land planning, regulating, and licensing activities. This order does not apply to permits issued by agencies for activities on land that is not federally owned.

14. (Farm) Conservation Reserve Program

This program provides cost sharing and rental payments to farmers for restoration and protection of farmed wetlands. It encourages protection of highly erodible uplands and filter strips along wetlands, which can reduce pesticide and sediment runoff into these wetlands. The program has been largely superceded by the Wetlands Reserve Program.

15. (Farm) Farmers Home Administration Wetland Related Programs

The Administration may grant or transfer easements on wetlands in its inventory of repossessed farmland to federal or state agencies for conservation purposes when the land meets certain criteria. The Administration may also forgive loans if the borrower grants a conservation easement.

16. (Farm) Swampbuster

By denying federal farm benefits to farmers who drain wetlands, Swampbuster discourages the conversion of wetlands on agricultural lands. States, local governments, and private groups can take advantage of this program by educating farmers about its provisions, and supplement it by denying other benefits to Swampbuster violators.

17. (Farm) Water Bank

Only available in certain states and counties. In participating counties, farmers can receive annual payments for up to 10 years for protecting and restoring agricultural, inland fresh wetlands and adjacent uplands that are important to breeding, nesting, or feeding of migratory waterfowl. To be eligible, wetlands must be in a USDA approved conservation plan.

18. (Farm)Wetlands Reserve Program

Designed to restore up to 1 million acres of agricultural wetlands, by providing financial incentives to farmers for long-term easements. Priority given to those willing to establish permanent easements. States can help publicize the program, and add additional incentives.

19. Federal Aid in Sport Fish Restoration (Dingell-Johnson) Act,
Federal aid in Wildlife Restoration (Pittman-Robertson) Act

Dingell-Johnson supplies money for 75% of fish restoration and management projects, and comprehensive plans for wildlife resource management, including education. Pittman-Robertson supplies 75% of funding of wildlife conservation activities, including acquisition, restoration, and maintenance of wetlands.

20. Federal Wetlands Research and Technical Assistance (Corps)

The Corps is conducting ongoing research programs. The time-frame of the study mentioned in this publication is already over.

21. Fish and Wildlife Coordination Act

Provides a key role for the states in evaluating the impacts on fish and wildlife conservation of water resource development projects or Clean Water Act Sections 402 or 404 permits. The Act requires that federal agencies give wildlife conservation equal consideration with other features of water-resource development programs.

22. (Fish and Wildlife Service) Private Lands Restoration Initiative

The Service focuses money and resources through a variety of authorities to encourage and help private landowners to restore converted and degraded wetlands and associated upland habitat.

23. Internal Revenue Code

State and local governments can increase wetlands protection by education landowners about the federal tax benefits of land donation (or the giving of easements), and encouraging the work of private, nonprofit land trusts.

24. Land and Water Conservation Fund Act

Under this act, each state is required to produce a State Comprehensive Outdoor Recreation Plan, in order to be eligible for assistance. Funding provided can be used for land acquisition and recreation development.

25. Migratory Bird Conservation Fund

The Fund finances acquisition of land for the national wildlife refuge system, and provides a system for making refuge acquisition decisions.

26. National Environmental Policy Act

This act allows state, local, and private groups to ensure that the impacts of federal actions impacting wetlands are considered. Environmental Impact Statements must be prepared for projects with significant environmental impacts. Environmental review is required for all federal actions, including permits, licenses, loans, and other subsidies.

27. National Estuary Program

The Program provides impetus, funding, and technical assistance for the management of nationally significant estuaries, of which wetlands are an important component. Governors can nominate estuaries for inclusion in the program.

28. National Flood Insurance Program

This program can benefit wetlands by (1) designating "floodways" along rivers and streams (restricting any development in that area), and (2) encouraging communities to protect open space and limit floodplain development by offering advantageous flood insurance rates for communities that exceed minimum federal standards for floodplain management.

29. Near Coastal Waters Program

The near coastal waters program seeks to improve management of the environmental quality of these waters, which include tidal inland waters and those ocean waters affected by pollution from the land. EPA has funded state demonstration projects, as well as developing 10-15 year strategic plans for near coastal waters.

30. North American Waterfowl Management Plan

Joint-venture partnerships under the plan benefit from shared resources, as well as research and educational information developed by the program. The goal of the plan is to restore 6 million acres of wetlands and upland crucial to waterfowl survival.

31. North American Wetlands Conservation Act

By this act, states and private groups can receive matching grants for wetlands conservation projects if the projects further the goals of the North American Waterfowl Management Plan, and international migratory bird treaties. Grants are available for acquisition of land or water rights for restoration, management, or enhancement.

32. Ramsar Convention

The Convention on Wetlands of International Importance Especially as Waterfowl habitats, known as Ramsar, is an intergovernmental treaty that obligates its 45 signatory nations to consider wetlands conservation in their land-use planning, to promote wise use of their

wetlands, to establish wetlands nature reserves, and to encourage wetlands research and data exchange. Additionally, each country must designate at least one site for inclusion in a List of Wetlands of International Importance.

33. River Conservation and Management

States can initiate designation of rivers as wild and scenic, which results in federal consultation, coordination, and protection, particularly from impacts of water resources development projects. Technical assistance is also available for conservation and management of all rivers. Wetlands bordering rivers can benefit from this protection and management.

34. Special Area Management Plans

States, Local Governments, and private groups can play a major role in preparing these plans. Funding is available to states for preparation and implementation of these plans in coastal zones.

35. Surplus Federal Property Transfer

Surplus federal property can be assigned to the Department of the Interior, which may then transfer it to state or local government at no or low cost. Properties must be used either for recreation, nature preserves and open space for wildlife watching or nature study, or for wildlife conservation.

36. Water Resource Development

These omnibus measures authorized construction or study of hundreds of new water resources development projects, to be undertaken by the Corps. These acts added new restrictions that specifically require wetlands protection.

37. Watershed Protection and Flood Prevention Act

The Soil Conservation Service provides financial and technical assistance to local organizations in planning and carrying out projects for watersheds not larger than 250,000 acres. The purposes of this program include flood prevention, agricultural water management, recreation, water supply, and fish and wildlife development.

III.3 State Mechanisms

Acquisition

Strengths – control, flexibility, possibilities of cost-sharing, land-dispute resolution
Challenges – cost, delay, management responsibility
Users – state natural resource agencies, private sector
Resources – dedicated funding, local revenue and involvement, long-term management
Coordination – funding with federal government, management plan implementations

Wetlands Regulation

Strengths – adaptability, broad scope
Challenges – unpopularity, enforcement
Users – state, regional, county, or municipal government organizations
Resources – funding, implementing organizational structure
Coordination – with federal and local requirements to reduce conflicts and redundancy

Floodplain Management

Strengths – protects wetlands in floodplains, allows stringent standards
Challenges – lack of wetlands focus
Users – state agencies and local governments
Resources – long term funding and management staff
Coordination – state/local watershed management plans

Shoreline Protection Programs
Strengths – integrated resource protection, local involvement, state-established minimum standards
Challenges – exclusion of isolated wetlands, exemption of others
Users – state environmental agencies, local governments
Resources – staff for development
Coordination – wetlands regulations, protection incentive programs

Wild and Scenic Rivers Protection Programs
Strengths – protects range of values, geographic flexibility, regulates land-use
Challenges – no regulatory authority, narrow geographic scope, protection of aesthetic values
Users – state environmental agencies
Resources – small budget and staff requirements
Coordination – private organizations (non-profits), federal government, non-regulatory programs

Endangered Species Protection Programs
Strengths – link between wetlands and endangered species habitat, coordination with federal law
Challenges – lack of protection for habitat, limited applications
Users – state department of natural resources
Resources – funding, enforcement
Coordination – federal endangered species act, possible state laws

Water Rights Programs
Strengths – links water quality to wetlands
Challenges – limited geographic scope, competing uses, lack of specific wetlands protection provisions
Users – state legislatures, water agencies or divisions, state courts
Resources – permitting program
Coordination – other regulatory programs

State Environmental Policy Acts
Strengths – increased protection, early assessments
Challenges – cost and delay, obtaining unbiased data
Users – state environmental agency
Resources – staff, funding, expertise, data gathering
Coordination – multiple agencies, programs, and levels of government

Statewide Land-Use Plans
Strengths – links wetlands protection to land-use planning, promotes local consistency
Challenges – lack of wetlands-specific focus, extensive resource needs

Users – multiple agencies, state legislation, public interest
Resources – lead state agency, financial investment
Coordination – regulatory programs

Special Area Plans
Strengths – follow ecological boundaries, conflict resolution, regional/local participation
Challenges – generate controversy, resource needs
Users – state agencies, local governments, landowners, interest groups
Resources – technical studies and data, staff, funding
Coordination – local government land-use plans, state planning

Greenway/River Corridor Plans
Strengths – follow ecological boundaries
Challenges – provide coordination opportunities, foster public support, lack of wetlands focus, high multiple interest use
Users – state agency, city parks department, local landowners, non-profits, land trusts
Resources – planning information, funding, technical assistance
Coordination – recreation plans, floodplain management

Special Purpose Plans
Strengths – specificity
Challenges – limited scope
Users – various agencies, local governments, special interests
Resources – data, maps, accurate information
Coordination – other plans

Restoration, Creation and Management
Strengths – models, partnership opportunities, widespread support
Challenges – uncertain success, ongoing monitoring, long time frames
Users – state agencies
Resources – staff technical expertise, funding, research
Coordination – federal, state, local programs

Financial Incentives
Strengths – public support, specific protection
Challenges – effective rewards, structuring, loss of local revenue
Users – state agency, local tax agency, landowners
Resources – funding, staff involvement
Coordination – regulatory programs

Local Government Assistance
Strengths – augmenting local resources, state involvement
Challenges – acquiring and maintaining resources
Users – state agencies and local governments
Resources – accurate and current data, staff
Coordination – other local programs

Landowner Assistance

Strengths – promotes compliance, provides information
Challenges – reaching landowners, communication
Users – state agencies, landowners
Resources – skilled staff, time
Coordination – many programs and policies

Curricula Development
Strengths – flexibility, reach, education
Challenges – support for wetlands education
Users – schools, agencies, public, teachers
Resources – skilled staff, educational materials, communication
Coordination – school programs, general community education

Outreach
Strengths – education, support, marketing
Challenges – costliness, communication
Users – state agencies, public
Resources – accurate information, funding
Coordination – education, regulatory and incentive programs

Research
Strengths – basis for policies, support for programs
Challenges – resources needs
Users – agencies, local programs
Resources – funding, staff, time
Coordination – many programs

III.4 Local Mechanisms

Acquisition
Strengths – control, flexibility, partnering possibilities, resolution of land use disputes
Challenges – costliness, off-site impacts
Users – local governing bodies, voters
Resources – funds
Coordination – conservation planning

Regulation and Zoning*
Strengths – minimum standards, broad acceptability, scope
Challenges – long-term commitment, incorporating protection into zoning
Users – local government, industry, private landowners, state agencies
Resources – staffing and funding
Coordination – local planning, state planning and programs
*zoning techniques include special permits, cluster zoning and planned unit development, performance based zoning, overlay zones and large-lot zoning

Planning
Strengths – sound decision making, legal defense
Challenges – inconsistency, resource needs
Users – local governments, private groups and landowners

Resources – staff, time, expertise
Coordination – plans at state, national level, zoning

Capitol Improvements Programming
Strengths – coordinate local spending with resource assessments
Challenges – high resource needs
Users – local government of any type
Resources – funding, staff
Coordination – other local programs, zoning, agencies

Use-Valuation for Wetlands
Strengths – reduces development pressure by reducing tax burden
Challenges – reduces local tax base
Users – local and state financial agencies
Resources – staff time
Coordination – state financial agency

III.5 Private Mechanisms

Acquisition:
conservation easements, donations, sales, rights of first refusal
Pre-Acquisition:
limited or controlled development
Regulation:
political action, litigation, watchdog activities, technical assistance
Planning:
attending public hearings, completing privately funded research projects, developing brochures and other educational information
Incentives:
leases and management agreements, green programs
Restoration, Creation, and Management
Technical Assistance, Education and Outreach
Research:
done for land-acquisition, post-project evaluations, policy research, scientific research for an institution – zoo, university, etc.

IV Wetlands Data Sources and Collection Methods

IV.1 Introduction

In order to identify problems and come up with the best management solutions for wetlands, states must address certain questions regarding the location, type, conditions and functions of wetlands currently in existence, as well as the status and trends of impacts.
These questions can be addressed at three levels of data collection intensity; levels 1-3. Level 1 sources are low cost, large scale, and low accuracy methods. Levels 2 and 3 increase in accuracy, precision, and cost.

Example questions
How many wetlands does a state have, and where are they located?
Level 1: Data from NWI maps, STATSGO digital soils maps

Level 2: NWI maps, SSURGO soil maps, floodplain maps, swampbuster maps
Level 3: Updated NWI maps through field checking, or imagery techniques

What kinds of wetlands are they?
Level 1: NWI maps
Level 2: field check, classify according to vegetation

What are the wetland's functions?
Level 1: Review and consultation of literature and experts
Level 2: Assessment field techniques, linking SOILS5 files to STATSGO or SSURGO data
Level 3: directly measure functions of representative wetlands

What condition are the wetlands in?
Level 1: Review trends reports
Level 2: Overlay land cover maps with NWI or hydric soil maps, consult planning studies
Level 3: Directly measure functions, evaluate wetlands according to aerial photos

How Rapidly are wetlands disappearing, and where is the loss concentrated?
Level 1: Obtain data from FWS Status and Trends reports
Level 2: Intensify FWS estimations through aerial photograph interpretations, compare permit data files with replacement records
Level 3: Compare NWI maps to hydric soil maps, find difference

Which activities are most responsible for wetlands degradation and loss?
Level 1: Interview regulatory staff and scientists
Level 2: Review aerial photos, analyze permit data files, other statistical analysis
Level 3: Field inventory wetlands with adjacent land uses

What are the consequences of loss?
Level 1: Compile accounts from experts
Level 2: Correlate long-term wildlife and economic changes
Level 3: intensive study of a representative wetlands sample

Selecting a Data Collection Method
Factors to consider: level of detail, appropriateness of the method, data validity

IV.2 Review of Sources and Methods
1) Wetlands Classification Schemes
A. Cowardin et al. Classification – This scheme has been officially adopted by the FWS and most other federal agencies. A wetland is placed in hierarchical categories, based on interpretation of aerial imagery or ground observation.
B. Hydrogeomorphic (Brinson) Classification – Wetlands are classified according to indicators, which are highly inter-correlated. This information presents a profile of wetlands from which the wetlands functions are postulated by an experienced professional. Natural wetlands reference sites are used to validate the postulations.
2) Maps and National Databases
A. National Wetlands Inventory (NWI) Maps – Same scale as USGS topographic maps, minimum wetland scale is one to three acres, whole us coverage, wetlands classified using Cowardin et al., developed from aerial photo interpretations, accuracy

approximately 90%.

B. SCS County Soil Survey Maps (SSURGO) – 1:15,840 to 1:31,680 scale, 70% of US counties are mapped, wetlands inferred from presence of hydric soils, hydric soils determined from scientific examination of soil profiles along transects, minimum unit 1 acre.

C. SCS STATSGO and NATSGO Maps – 1:250,000 scale, minimum unit 100 acres (STATSGO), and 1:3,000,000 scale (NATSGO). All states have digital coverage, wetland presence inferred from hydric soils, developed from sampling and reviewing SCS County Soil Surveys.

D. SCS Swampbuster Maps – 1:12,000 or 1:20,000 scale, primarily cropland coverage, wetland boundaries hand-drawn on aerial photos based on hydric soil and vegetation overlays, visible water, and ground truthing., very detailed and extensive maps where available.

E. FEMA Flood Hazard Maps – 1 in. = 2000 ft. to 1 in. = 200 ft. scale, maps available for 22,000 US communities, show 100 year and 500 year event floods, developed from topographic maps, stream flow data, channel crossings, and aerial photos with some ground checking. Does not contain wetland specific data, but hydrologic data may prove useful.

F. USGS Land-Use Land Analysis Maps – mostly at 1:250,000 scale, minimum map unit is 40 acres, available for most of US, classify wetlands according to forested or non-forested, developed by 1:62,500 scale aerial photo interpretation.

G. NOAA Change Analysis Program Database – maps at 1:24,000 to 1:62,500 scale, minimum unit size is one to three acres, available for 507 counties and 92 estuaries, classified coastal wetlands, based on a grid-sampling of NWI maps.

3) Data Sources on Wetlands Status and Trends

A. FWS Status and Trends Reports – compiled wetlands changes by type of change and wetlands type, coverage is entire US, minimum unit is one acre, used stratified, weighted random plot samples, using 4 decades of aerial photos for determination.

B. National Resources Inventory (NRI) database – changes calculated by region, and occasionally at state level. Field personnel visited a portion of 300,000 randomly selected sites, sites not visited were analyzed by aerial photo, NRI is repeated every 5 years.

C. Forest Inventory and Analysis (FIA) Database – data available on the status of forest types commonly associated with wetlands, data on acreage of forest cover and types are based on field measurements, trends calculated from many reports.

D. USDA Drainage Statistics Data – county level data for most states, trends based on manually calculated tabular data, collected by volunteer reporting by farmers.

E. Environmental Monitoring and Assessment Program (EMAP) – data available for all areas of the US, based on measurements of ecological indicators, repeated every four years. About 3,000 wetlands of a wide range of types are sampled, which are then extracted to the general trend of all of the same wetland types.

F. Wetlands Loss Calculated by Hydric Acreage Minus NWI Acreage – this is an approach, not a compiled source, that entails subtracting the current NWI maps areas from the SCS hydric soil map areas (representing pre-disturbed wetland sites), and the remaining areas are the newly converted wetlands that have been lost.

G. Wetlands Loss Calculated from Examinations of Permit Files – this is an approach, not a compiled work, that entails calculating the acreage lost through permitted developments, minus the wetlands acreage that was restored or created in the state over the same time frame.

H. Trends in Wetlands-Related Resources – the following sources do not estimate wetlands trends directly, but describe the trends of related resources: Breeding Bird Survey Database; Christmas Bird Count Database; Waterfowl Parts Database, Water Quality and Streamflow Trends from USGS Sampling Stations.

I. NOAA Change Analysis Program Data – map scale at 1:100,000, comparing coastal wetlands including the Chesapeake bay, from multiple data sources over time.

4) Rapid Methods for Evaluating, Ranking, or Categorizing Wetlands

Considerations when choosing a method; inclusion of essential indicators, consideration of temporal dynamics, hierarchical relations among indicators, physical/landscape context, social context, effort needed to collect background and primary data, sensitivity.

A. Habitat Assessment Technique, (HAT) – applicable to all wetland types, involving an ornithologist inventories birds during the breeding season in a wetland, scoring them on diversity and uniqueness, compared against background data. HAT is based on the premise that habitats containing larger numbers of species and uncommon species are of greater regulatory concern.

B. Habitat Evaluation Procedures (HET) – applicable to wetland types containing at least five species with available habitat suitability models. Involves a team of biologists selecting a few species that could potentially use a habitat unit, and surveying to find the overall habitat suitability of the wetland for each species.

C. Synoptic Approach for Wetlands Cumulative Effects Analysis – applicable to all wetland types, addresses hydrologic, water quality, and life-support functions. This system uses spatial data from existing maps to produce output maps showing the condition of all landscape units according to each indicator.

D. Wetland Evaluation Technique (WET) 2.0 – applicable to all wetlands, eleven functions plus habitat suitability for fish and birds are addressed. First user collects and reviews existing data sources to determine significance. Topographic maps and aerial maps are then used with field visits to estimate the capacity of the wetland and its opportunities to perform a function. Wetland is classified according to yes-no questions as low-med-high for all 11 indicators.

E. Bottomland Hardwood Forest Habitat Evaluation Model – addresses wildlife habitat, landscape-level information is collected from maps and aerial photos. Data on plot-level indicators are collected using field plots, conditions rank habitat for animal types from 0-10, and are combined for overall suitability.

F. Connecticut/New Hampshire Method – 14 functions addressed, ranks a series of wetlands by function (not overall) in comparison to each other, not a standard level.

G. Habitat Evaluation System (HES) – addresses fish and wildlife habitat by evaluating structural indicators of habitat, which are not linked to any specific species. Oriented more toward game species, with an output of a score on a wetland habitat quality index, based on the user's judgement.

H. Hollands-Magee (Normandeau) Method – ten functions and values are addressed. The user visits the wetland on-site, and evaluates the wetland according to structural indicators by multiple choice questions. The wetland is then given an overall score that indicates value according to wetland type for providing function, but does not account for size.

I. Larson/Golet Method – addresses wildlife, groundwater, and visual/cultural value. This technique ranks a series of wetlands, but does not provide an absolute score for a single wetland. Only functions are rated, not the wetland overall, and no threshold is given to indicate whether a score is "high or "low."

J. Minnesota Wetland Evaluation Methodology (WEM) – eleven functions and values

are addressed. Rates functions based on site characteristics, and allows the user to assign scores to the categorical ratings, and to weight the functions based on preference. The end product is an overall wetlands score.

K. Ontario Method – 15 functions and values are addressed, wetlands are ranked according to each other and not assigned an overall score. Final score is equal to the unit score multiplied by the acreage.

5) Intensive Methods for Individual Wetlands

These methods are most usable when there is a likelihood of litigation, needs exist for detailed management plans, or where multiple uses demand more precise results. Many techniques exist for gathering precise results, most of which fall into one or more of the categories below.

A. Biological Functions – using indicator taxa including amphibian, algae, birds, fish, mammals, reptiles, and vegetation to judge the overall health, composition, and functions of the wetland in question.

B. Hydrologic Functions – there is no standard reference for measure the hydrologic functioning of wetlands. Most hydrologic measuring techniques are very technical and time and data intensive.

C. Water Quality Functions – no standard exists, soil measurement techniques are often used, chemical or nutrient level monitoring is also common.

D. Cumulative Functions – assessing aggregate contributions of wetlands to regional functions. Mapping, trends analysis, and state of the environment reports are useful in these measurements.